T.D

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/624,350	07/21/2003	Sascha Kreiskott	S-99,952	9406

35068 7590 03/15/2006

UNIVERSITY OF CALIFORNIA
LOS ALAMOS NATIONAL LABORATORY
P.O. BOX 1663, MS A187
LOS ALAMOS, NM 87545

EXAMINER	
ALEXANDER, MICHAEL P	
ART UNIT	**PAPER NUMBER**
1742	

DATE MAILED: 03/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/624,350	KREISKOTT ET AL.	
	Examiner	Art Unit	
	Michael P. Alexander	1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 January 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-5 and 7-19* is/are pending in the application.

4a) Of the above claim(s) *14-19* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-5 and 7-13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim(s) 1 and 3-5 and 7-16 is/are pending.

Election/Restrictions

Claims 14-19 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 17 January 2006.

Claim Objections

Claims 9 and 12 are objected to because of the following informalities: "said electropolishing unit" has no antecedent basis. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1, 3-5, 7-8 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Qiao (provisional application 60/483956 of U.S. Pat. Pub.

2005/0000826 A1) in view of Datta et al. (U.S. Pat. 6,228,246 B1) and Rosswag (U.S. Pat. 4,372,831).

Claims 1, 3-5, 7-8 and 13 are rejected on the same grounds as stated in the Office Action ~~filed~~ mailed on 12 July 2005. The Examiner notes that claim 1 has been amended to incorporate the features of original claim 2.

Claims 9 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Qiao in view of Datta and Rosswag as applied to claim 1 above, and further in view of Drummond et al. (US 2,330562).

Regarding claim 9, the cited references do not specify that the metallic tape would be in direct electrical contact with an anode in the electropolishing unit while the metallic tape is within an electrically conductive liquid throughout the electropolishing unit and within the bath in the polishing section, the bath further in contact with a cathode in the electropolishing unit so as to complete an electrical circuit. However, Drummond teaches (Fig. 1 and col. 2 line 44 – col. 3 line 6) in a continuous electropolishing method that a thin metallic strip (10) would be in direct electrical contact with an anode (26) in the electropolishing unit while the metallic tape is with an electrically conductive liquid (16) throughout the electropolishing unit and with the bath in the polishing section, the bath further in contact with a cathode (22) in the electropolishing unit so as to complete an electrical circuit. It would have been obvious to combine the process of the cited prior art with the continuous electropolishing method of Drummond because the thin metal strip of Drummond is an analogous workpiece to the thin metallic tape of the cited prior art.

Regarding claim 12, the cited reference do not specify that the metallic tape would be in direct electrical contact with an anode in the electropolishing unit while the metallic tape is in contact with mechanical contacts as the metallic tape is passed through the bath so as to complete an electrical circuit. However, Drummond teaches (Fig. 1 and col. 2 line 44 – col. 3 line 6) in a continuous electropolishing method that a thin metallic strip (10) would be in direct electrical contact with an anode (24) in an electropolishing unit while the metallic tape is in contact with mechanical contacts (26) as the metallic tape is passed through the bath so as to complete an electrical circuit. It would have been obvious to one of ordinary skill in the art to combine the process of the cited prior art with the continuous electropolishing method of Drummon because the thin metal strip of Drummond is an analogous workpiece to the thin metallic tape of the cited prior art.

Claims 10-11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Qiao in view of Datta, Rosswag and Drummond as applied to claim 9 above, and further in view of Tezuka et al. (US 5,843,290).

Regarding claim 10, the cited prior art does not specify that the anode would include one of the claimed metals. However, Tezuka teaches (col. 6 lines 10-23) that it is preferable to use titanium as an anode when the electrolyte is an acidic electrolyte because the titanium is resistant to the electrolyte. It would have been obvious to modify the method of the cited prior art by forming the anode from titanium because titanium is resistant to acid electrolytes as taught by Tezuka.

Regarding claim 11, see the rejection of claim 5 in the Office Action filed on 12 July 2005.

Claim Rejections - 35 USC § 103

Claims 1, 3-5, 7-8 and 13 are rejected under 35 U.S.C. 103(a) as being obvious over Arendt et al. (US 2003/0144150 A1).

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). This rejection might also be overcome by showing that the reference is disqualified under 35 U.S.C. 103(c) as prior art in a rejection under 35 U.S.C. 103(a). See MPEP § 706.02(l)(1) and § 706.02(l)(2).

Regarding claim 1, Arendt teaches (0026) a process of providing a highly smooth surface to a metallic tape, the process comprising: passing a metallic tape having an initial roughness of more than about 10 nm as a RMS roughness through an acid bath

inherently contained within a polishing section of an electropolishing unit over a pre-selected prior of time; and passing a mean surface current density of at least 0.18 amperes per square centimeter through the metallic tape during the period of time the metallic tape is in the acid bath whereby the roughness of the metallic tape is reducted to a RMS roughness to less than about 4 nm.

Still regarding claim 1, Arendt does not specify that the process would be continuous. However, it is prima facie obvious to make a batch process continuous. See MPEP 2144.04 V E. It would have been obvious to one of ordinary skill in the art to modify the method of Arendt by making it continuous in order to achieve the normal and expected benefits of making a batch process continuous.

Regarding claims 3-4, Arendt teaches (0026) that the current density would be at least 0.18 amperes per square centimeter which overlaps with the claimed range of at least 0.37 amperes per square centimeter, which is prima facie evidence of obviousness. See MPEP 2144.05 I. It would have been obvious to one of ordinary skill in the art to select the desired current density from the range of current densities disclosed by Arendt because Arendt teaches the same utility throughout the disclosed range.

Still regarding claims 3-4, Arendt (0026) teaches that the final RMS roughness be reduced to less than about 1 nm, which overlaps with the claimed range of less than about 0.5 nm, which is prima facie evidence of obviousness. See MPEP 2144.05 I. It would have been obvious to one of ordinary skill in the art to select the desired final

RMS roughness from the range of roughness values disclosed by Arendt because Arendt teaches the same utility throughout the disclosed ranges.

Regarding claim 5, Arendt teaches (0026) that the acid bath would include a mixture of sulphuric and phosphoric acid.

Regarding claims 7-8, Arendt teaches (0024, 0026) that the tape would be a polycrystalline metal including nickel.

Regarding claim 13, the electropolishing method of Arendt would inherently include passing the metallic tape through the bath and the bath would inherently provide electrical contact with the metallic tape.

Claim Rejections - 35 USC § 103

Claims 1, 3-4, 7-8 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arendt et al. (US 2003/0036483 A1) in view of Rosswag (US 4,372,831).

Regarding claim 1, Arendt teaches (0015-0016) a process of providing a highly smooth surface to a metallic tape, the process comprising: electrochemical polishing a metallic tape having an initial roughness of more than about 10 nm as a RMS roughness (which inherently includes passing the metallic tape through a bath contained within a polishing section of an electropolishing unit over a pre-selected period of time); and inherently passing a current density through the metallic tape during the period of time the metallic tape is in the bath whereby the roughness of the metallic tape is reduced to a RMS roughness of less than about 4 nm.

Still regarding claim 1, Arendt does not specify that the process would be continuous. However, it is prima facie obvious to make a batch process continuous. See MPEP 2144.04 V E. It would have been obvious to one of ordinary skill in the art to modify the method of Arendt by making it continuous in order to achieve the normal and expected benefits of making a batch process continuous.

Still regarding claim 1, Arendt does not specify that the bath would be an acid bath. However, Rosswag teaches (abstract, col. 1 lines 13-57) an acid electrolyte for electropolishing in order to dissolve the surface of the metal. It would have been obvious to one of ordinary skill in the art to modify the method of Arendt by providing an acid electrolyte for the bath in order to dissolve the surface of the metal as taught by Rosswag.

Still regarding claim 1, Arendt does not specify that the current density would be at least 0.18 amperes per square centimeter. However, Rosswag teaches (col. 3 lines 26-30) that industrial gloss would be obtained at lower current densities and that mirror gloss would be obtained at higher current densities. Since current density is a result-effective variable as taught by Rosswag, it would have been obvious to one of ordinary skill in the art at the time of the claimed invention to electropolish at the desired current density by a routine optimization in order to obtain the desired finish. See MPEP 2144.05 II.

Regarding claims 3-4, Arendt teaches (0016) that the final RMS roughness be reduced to less than about 1 nm, which overlaps with the claimed range of less than about 0.5 nm, which is prima facie evidence of obviousness. See MPEP 2144.05 I. It

would have been obvious to one of ordinary skill in the art to select the desired final RMS roughness from the range of roughness values disclosed by Arendt because Arendt teaches the same utility throughout the disclosed ranges.

Still regarding claims 3-4, Arendt does not specify that the current density would be at least 0.37 amperes per square centimeter. However, Rosswag teaches (col. 3 lines 26-30) that industrial gloss would be obtained at lower current densities and that mirror gloss would be obtained at higher current densities. Since current density is a result-effective variable as taught by Rosswag, it would have been obvious to one of ordinary skill in the art at the time of the claimed invention to electropolish at the desired current density by a routine optimization in order to obtain the desired finish. See MPEP 2144.05 II.

Regarding claims 7-8, Arendt teaches (0015) that the tape would be a polycrystalline metal including nickel.

Regarding claim 13, the electropolishing method of Arendt would inherently include passing the metallic tape through the bath and the bath would inherently provide electrical contact with the metallic tape.

Claim Rejections - 35 USC § 103

Claims 1, 3-5, 7-8 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Glowacki et al. (Texture development in long lengths of NiFe tapes for superconducting coated conductor) in view of Rosswag (US 4,372,831).

Regarding claim 1, Glowacki teaches (pages 167-168) a continuous process of providing a highly smooth surface to a metallic tape, the process comprising: passing a

metallic tape having an initial roughness of more than about 10 nm as a RMS roughness through a bath contained within a polishing section of an electropolishing unit over a preselected period of time; and passing a current density through the metallic tape during the period of time the metallic tape is in the bath whereby the roughness of the metallic tape is reduced.

Still regarding claim 1, Glowacki does not specify that the bath would be an acid bath. However, Rosswag teaches (abstract, col. 1 lines 13-57) an acid electrolyte for electropolishing in order to dissolve the surface of the metal. It would have been obvious to one of ordinary skill in the art to modify the method of Glowacki by providing an acid electrolyte for the bath in order to dissolve the surface of the metal as taught by Rosswag.

Still regarding claim 1, Glowacki does not specify that the current density would be at least 0.18 amperes per square centimeter and does not specify achieving a RMS roughness of less than about 4 nm. However, Rosswag teaches (col. 3 lines 26-30) that industrial gloss would be obtained at lower current densities and that mirror gloss would be obtained at higher current densities. Since current density is a result-effective variable as taught by Rosswag, it would have been obvious to one of ordinary skill in the art to modify the method of Glowacki by electropolish at the desired higher current densities by a routine optimization in order to obtain the desired mirror finish. See MPEP 2144.05 II. Furthermore, the Examiner asserts that a mirror gloss finish would inherently have a reduced RMS roughness of less than about 4 nm.

Regarding claims 3-4, Glowacki does not specify that the current density would be at least 0.37 amperes per square centimeter and does not specify achieving a RMS roughness of less than about 0.5 nm. However, Rosswag teaches (col. 3 lines 26-30) that industrial gloss would be obtained at lower current densities and that mirror gloss would be obtained at higher current densities. Since current density is a result-effective variable as taught by Rosswag, it would have been obvious to one of ordinary skill in the art to modify the method of Glowacki by electropolish at the desired higher current densities by a routine optimization in order to obtain the desired mirror finish. See MPEP 2144.05 II. Furthermore, the Examiner asserts that a mirror gloss finish would inherently have a reduced RMS roughness of less than about 0.5 nm.

Regarding claim 5, Glowacki does not specify that the bath can contain a mixture of sulfuric and phosphoric acid. However, Rosswag teaches (col. 1 lines 30-39) the addition of a mixture of sulfuric and phosphoric acid to the bath in order to electropolish metallic workpieces. It would have been obvious to one of ordinary skill in the art at the time of the claimed invention to combine a mixture of sulfuric and phosphoric acid with the bath of Glowacki in order to electropolish the metallic tape as taught by Rosswag.

Regarding claim 7-8, Glowacki teaches (page 167) that the tape would be nickel and does not specify that it would be single crystalline, therefore it can be assumed to be polycrystalline because polycrystalline is the naturally occurring state of nickel.

Regarding claim 13, the electropolishing method of Glowacki would inherently include passing the metallic tape through the bath and the bath would inherently provide electrical contact with the metallic tape.

Claims 9 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Glowacki in view of Rosswag as applied to claim 1 above, and further in view of Drummond et al. (US 2,330562).

Regarding claim 9, the cited references do not specify that the metallic tape would be in direct electrical contact with an anode in the electropolishing unit while the metallic tape is within an electrically conductive liquid throughout the electropolishing unit and within the bath in the polishing section, the bath further in contact with a cathode in the electropolishing unit so as to complete an electrical circuit. However, Drummond teaches (Fig. 1 and col. 2 line 44 – col. 3 line 6) in a continuous electropolishing method that a thin metallic strip (10) would be in direct electrical contact with an anode (26) in the electropolishing unit while the metallic tape is with an electrically conductive liquid (16) throughout the electropolishing unit and with the bath in the polishing section, the bath further in contact with a cathode (22) in the electropolishing unit so as to complete an electrical circuit. It would have been obvious to combine the process of the cited prior art with the continuous electropolishing method of Drummond because the thin metal strip of Drummond is an analogous workpiece to the thin metallic tape of the cited prior art.

Regarding claim 12, the cited reference do not specify that the metallic tape would be in direct electrical contact with an anode in the electropolishing unit while the metallic tape is in contact with mechanical contacts as the metallic tape is passed through the bath so as to complete an electrical circuit. However, Drummond teaches (Fig. 1 and col. 2 line 44 – col. 3 line 6) in a continuous electropolishing method that a

thin metallic strip (10) would be in direct electrical contact with an anode (24) in an electropolishing unit while the metallic tape is in contact with mechanical contacts (26) as the metallic tape is passed through the bath so as to complete an electrical circuit. It would have been obvious to one of ordinary skill in the art to combine the process of the cited prior art with the continuous electropolishing method of Drummon because the thin metal strip of Drummond is an analogous workpiece to the thin metallic tape of the cited prior art.

Claims 10-11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Glowacki in view of Rosswag and Drummond as applied to claim 9 above, and further in view of Tezuka et al. (US 5,843,290).

Regarding claim 10, the cited prior art does not specify that the anode would include one of the claimed metals. However, Tezuka teaches (col. 6 lines 10-23) that it is preferable to use titanium as an anode when the electrolyte is an acidic electrolyte because the titanium is resistant to the electrolyte. It would have been obvious to modify the method of the cited prior art by forming the anode from titanium because titanium is resistant to acid electrolytes as taught by Tezuka.

Regarding claim 11, see the rejection of claim 5 above.

Response to Arguments

Applicant's arguments, see page 9 lines 9-12, filed 17 January 2006, with respect to the rejection based on Andreshak et al. have been fully considered and are persuasive. The rejection of claims 1, 5, 7 and 9-13 has been withdrawn.

Applicant's arguments filed 17 January 2006 have been fully considered but they are not persuasive.

Applicant states that the present invention was completed prior to the date of publication in April 10, 2003 as evidenced by the published reference in the Journal of Superconductor Science and Technology. However, the Examiner asserts that the evidence provided is not commensurate with the scope of the invention. See below.

Response to Amendment

The declaration filed on 17 January under 37 CFR 1.131 has been considered but is ineffective to overcome the Qiao (US 2005/0000826 A1) reference.

The evidence submitted is insufficient to establish a conception of the invention prior to the effective date of the Qiao reference. While conception is the mental part of the inventive act, it must be capable of proof, such as by demonstrative evidence or by a complete disclosure to another. Conception is more than a vague idea of how to solve a problem. The requisite means themselves and their interaction must also be comprehended. See *Mergenthaler v. Scudder*, 1897 C.D. 724, 81 O.G. 1417 (D.C. Cir. 1897).

The Examiner asserts that the scope of the declaration is not commensurate with the scope of the claim. First, although the declaration describes electropolishing a metallic tape having an initial roughness of 20 nm, the declaration does not provide evidence of conception for electropolishing metallic tape having an "initial roughness of more than 10 nm" in claim 1, which would include surfaces with roughness orders of magnitude higher. Second, although the declaration describes applying current

densities of 0.17 A/cm^2 and 0.37 A/cm^2, the declaration does not provide evidence of conception for applying current densities of "at least 0.18 A/cm^2" and "at least 0.37 A/cm^2" in claims 1 and 3, which would include current densities orders of magnitude higher. Third, although the declaration describes reducing the roughness to 4 nm and to 0.5 nm, the declaration does not provide evidence of conception for reducing the roughness to less than about 4 nm in claim 1, which would include roughnesses orders of magnitude less than 0.5 nm. Fourth, the declaration does not provide evidence of conception for reducing the roughness to less than 0.5 nm in claims 3-4. Fifth, the declaration does not provide evidence of conception for an anode that includes a metal selected from the group consisting of titanium, niobium, tantalum, platinum, rhenium, rhodium, nickel, chromium, gold and silver.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael P. Alexander whose telephone number is 571-272-8558. The examiner can normally be reached on M-F 8:30-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V. King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

mpa

ROY KING
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700